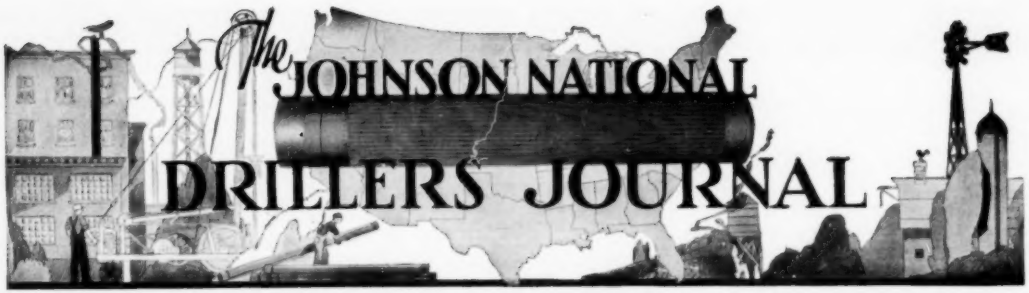

Vol. 24, No. 3 THE JOHNSON NATIONAL DRILLERS' JOURNAL May-June, 1952

GROUND WATER RESOURCES AND THEIR CONSERVATION

GROUND WATER RESERVOIRS

Ground water is without doubt our greatest and most important natural resource. Our people are just beginning to realize this and in many places are showing an increased interest in the matter of ground water conservation. Many articles have been written to make the public conscious of ground water. Some of these articles were downright misstatements of fact and others only displayed a lack of knowledge on the part of the writer.

To discuss any phase of ground water occurrence, movement, development, or conservation is far beyond the range and scope of the average individual. A broad knowledge of all phases of ground water development, including a knowledge of pumping from wells and the use of ground water, is required before anyone can discuss the subject of ground water reservoirs or conservation.

Not very many people have even a fundamental knowledge of ground water origin, or the amount of water in our ground water reservoirs; how it is used up, and what becomes of it after we have used it. We must remember that water as such cannot be created easily nor can it be entirely destroyed. All we can do with it is to change its form from a liquid to a vapor or to a solid and vice versa.

As we have said many times, the source of all ground water is rainfall or the annual precipitation. Since 1870 when the government started to keep records of rainfall, this has remained constant within reasonable annual variations. Thus, there is no shortage in the long range supply, only in the variations from year to year. As a result, the amount of water from our annual precipitation reaching our ground water reservoirs varies with the seasons and the years. This amount of water is tremendous and if it could all be conserved and used, there would be more than enough water for any conceivable use we might make of it. The trouble is that our ground water reservoirs vary widely in storage capacity. Some of them are almost inaccessible for economic pumping, others are large but are located where there is very little water due to low annual precipitation. All of these factors must be reckoned with when we talk glibly of conserving ground water.

Nowadays well drillers are finding it necessary to keep up with developments in modern well construction. Engineers, public officials and others interested in ground water development are demanding better well construction. Most of them are not interested in wells built by antiquated methods or of inferior materials.

Our main purpose in publishing this Journal is to keep people posted on new ideas, methods and materials which are constantly being developed, in order to make for more and better well drilling.

As a matter of fact, many conservationists think the word "conservation" means saving or hoarding of a natural resource. They approach the problem from the standpoint of preventing the use of ground water. A better view is to regard it as intelligent use within the limitations of our known supply and annual replenishment. After all, ground water is replenishable. It should be regarded as a transient resource varying from year to year within certain limits. Certainly no one is going to advocate that we save our ground water and not use it at all.

The reasons for shortages in surface water supplies are more readily understandable, as we can see an empty reservoir or a dry river bed and instantly tie it up with the fact there has been no rain for several months. What we do not see is the amount of water constantly percolating downward through the formations to the water table, nor the amount of water flowing out of a ground water reservoir regardless of weather conditions. This water is continuously flowing to lower places and finally ends up in the sea, unseen and unused.

To undertake the conservation of ground water involves a study of many questions that are not completely understood even today. Estimates have been made of the total use of ground water, one of the latest being 20,420,000,000 gal-

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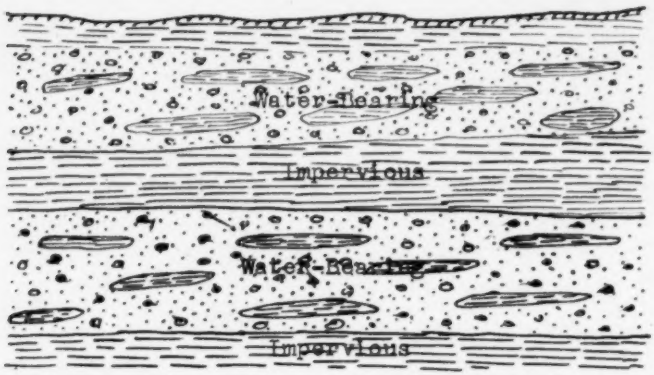

Reservoir condition favorable for artesian or water table wells in water-bearing formations separated by impervious bed. Recharge to upper water-bearing formation by percolation from surface to lower water-bearing formation by infiltration at point of outcrop.

GROUND WATER RESERVOIRS

(Continued from Page 1)

lons per day for all purposes. This huge figure reduced to rainfall is approximately the same as one inch of rainfall over the entire country, or a very small part of the thirty-inch average precipitation over the country.

The figure we have used for the total can be broken down as follows: 10,495,000,000 gallons for pump irrigation; 5,050,000,000 gallons for industrial purposes; 3,075,000,000 gallons for municipal use; and 1,800,000,000 gallons for rural use, excluding irrigation. No doubt if an estimate were made of today's use of ground water, it would be appreciably higher.

Some of our ground water shortages can be explained very easily, others are more difficult and require more study. Such shortages as have become critical can usually be associated with some local uncontrolled use of ground water. Few people realize the enormous growth of our cities and industries, and the vast pump irrigation projects in the West which are not much more than thirty or forty years old. These developments are in a way responsible for the tremendous use of ground water today.

What then can be done to conserve ground water? The answer cannot be given in a few words, but some essential requirements are evident that should be conceded by all regardless of their personal interest or conception of ground water. First, a fairly accurate estimate of the rate of ground water replenishment in the area must be made by people capable of making such estimates. Second, a similar estimate of ground water reservoir losses both natural and artificial (pumping) should be made. Third, the use of ground water in the area should be limited to the annual safe yield of the water-bearing formations.

The application of these three fundamentals to areas where critical shortages have developed will go a long way to stabilize the economy of the area. If, however, these essentials are disregarded, then there is only one answer, the economy of area is reduced to the point where everyone suffers.

Before this point is reached, there are several things that may be done to conserve the remaining ground water or even restore it to its former levels. These are conservation measures. They may be some form of recharge, such as water spreading, reductions in the use of water by the proper use of water from our ground water reservoirs, prevention of natural reservoir losses and better well construction.

Considerable research has been done along the line of recharge, by the use of water spreading, recharge, wells and otherwise, but there is still plenty of room and time for further work along these lines. Dean C. Muckel, Engineer, Division of Irrigation and Water Conservation, Soil Conservation Service, U. S. Department of Agriculture, Pomona, California, has probably had as much experience as any one in this country at this sort of work. As a result of his research and studies, we know more about this subject than was available previously. Water spreading is the diversion of water from natural streams and spreading it over lands that will absorb water readily. The spreading water sinks into the pervious formations below the surface and eventually becomes a part of the ground water in storage.

Larger quantities of water are required for spreading operations than for irrigation. The water must be spread over the land for long periods of time and on surfaces that oftentimes require considerable work to put them in shape to absorb large quantities of water. If proper preparations are made, several acre feet of water can be put into one acre of surface, in one day. Water spreading as a method of ground water replenishment is not new as it was tried by the Denver Union Water Company in the South Platte Valley in 1889. Since then there has been much improvement in the methods used in water spreading. Today California is probably the location of more water spreading projects than any other section of the country. It was first attempted on a larger scale in the South Coastal Basin and has now been carried to other parts of the state wherever feasible for this sort of work. In the Central Valley Water Plan, of which the San Joaquin Valley is a part, water spreading is provided for as a part of the plan. Research to develop the best methods of preparing the surface and of applying water have been carried on since 1936. Many interesting things have been found out, and much remains to be learned, but the fact still remains that water spreading under proper conditions is a feasible and dependable method of replenishing ground water reservoirs.

Under the heading of proper use of ground water from our ground water reservoirs, we must have in

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mind what a ground water reservoir is, how it obtains and loses its water, how much water it will hold, and especially how much water can be taken from it annually without lowering its level to the danger point. Some of our underground reservoirs hold far more water than our largest surface reservoirs. Our problem is not only to make maximum use of this water now, but to maintain it indefinitely for the use of future generations. To do this, it is manifestly necessary to use the water in a ground water reservoir, and by lowering its levels make room for more water. If the water levels are not lowered by use of the water in storage, then the annual replenishment from rainfall simply passes on to some lower point or is discharged at the outlet. One good thing about ground water reservoirs is that there is no loss by evaporation nor do they fill up with silt.

Therefore, one of the first questions to be determined is how much of the annual pumpage is being taken from ground water storage and how much is being replaced by rainfall or artificial means. It is apparent that water which gets into a ground water reservoir may be there a long time or a short time depending on the withdrawals and natural losses from the reservoir. For this reason some ground water reservoirs will supply a large number of wells over long periods of drought, while others with a limited storage capacity have a limited safe yielding capacity, drought or no drought.

As an example of this, we can cite the vast deposits of sand and gravel of glacial origin in the northern part of this country. In general, these deposits are easily recharged, but they are irregular in shape, thickness, and grading of materials and, in any given area, wells must be located and operated in such a way that the maximum yield can be obtained without drawing upon the vast amount of water in permanent storage. Naturally when wells are located too closely to each other or are pumped at rates beyond the "safe yield" of the formations, shortages develop locally, although there is plenty of unused water existing in the same aquifer or ground water basin.

Practically all of the vast quantity of ground water pumped on Long Island is recharge from the annual precipitation. Overpumping has developed some critical areas and salt water has moved in. These conditions are being corrected by close supervision and regulation of pumping by the New York State Water Power and Control Commission. In the Mississippi Valley much water is pumped from wells in limestone and sandstone. Where these formations are near the surface, there is considerable recharge, but where they lie deep and many of them do, the long continuous pumping for municipal and industrial use has created a permanent depression in the area of artesian pressure. Thus there has been no shortage of water in these areas but pumping levels have receded in places over 200 feet.

Along the Coastal Plain, both on the Atlantic and the Gulf side, there have been many places where heavy pumping has brought in salt water resulting in wells being so badly polluted with salt that they had to be relocated in areas at some distance from the shore. In the high plains area in the Panhandle district of Texas large quantities of water have been pumped for irrigation. The supply was sufficient for the first installations, but the idea of pump irrigation spread and pumpage increased at such a rapid rate that the safe yield of the ground water reservoir was soon reached. Today the future of the whole area is in the balance as the water table has dropped over practically all of the area and it has been discovered that most of the water now being pumped is from ground water storage. In a situation like this, there is only one remedy and that is a reduction in the rate of pumping. California, New Mexico, and Arizona have experienced similar conditions in heavily pumped areas. In fact, there are many places where heavy local pumping for all purposes has exceeded the safe yield of the ground water available.

While there are several ways that the water in ground water reservoirs can be conserved and at the same time used beneficially, there are also ways of wasting stored water without benefit to any one. One of the most common wastes of this kind is the uncontrolled flow of artesian water and non-use of water flowing from springs. Many states have attempted to stop the practice of allowing artesian flows to be wasted but the practice continues in places. Many years ago the artesian flow from the Dakota sandstone was noted for its strong steady flow. The first wells drilled to this formation at Ellendale, North Dakota, in 1886, came in with a flow of 600 g.p.m. under a pressure of 145 pounds per square inch. By 1896 over 400 artesian wells had been built in the Dakota sandstone in

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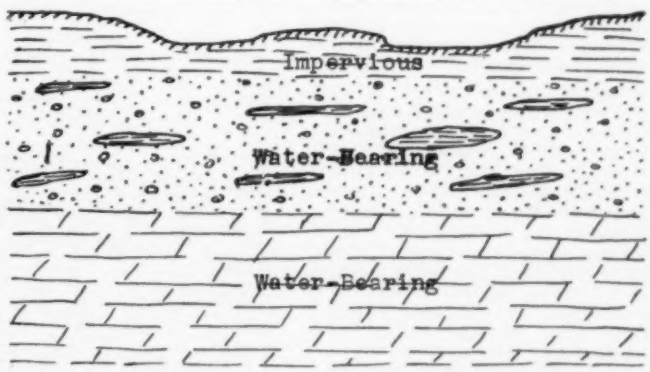
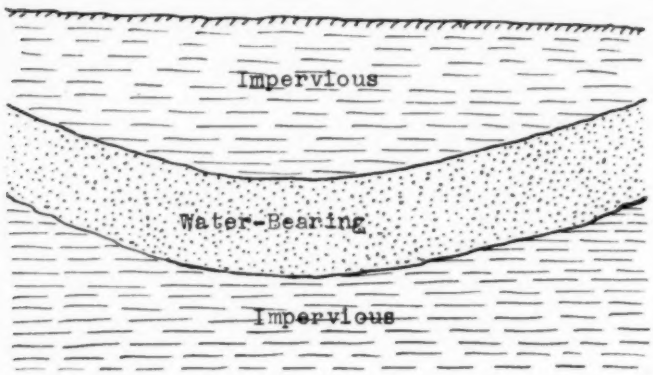


Reservoir condition favorable for water table wells in upper water-bearing formation and artesian wells in lower formation. Water-bearing formations recharged by infiltration from surface.



Reservoir condition favorable for artesian flow from wells. Water-bearing formation recharged by infiltration at points of outcrop.

GROUND WATER RESERVOIRS

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the states of North Dakota and South Dakota and in 1923 the head in the Ellendale well had been reduced to the surface level and the well would not flow. Many investigations proved beyond any doubt that large quantities of this water was being wasted.

The State Engineers of both states realized that if this waste of artesian water was not stopped, the artesian flow from the Dakota sandstone would cease and another valuable natural resource would be wasted. In 1921 laws were passed in North Dakota to stop this waste by capping all unused flowing wells, regulation of drilling and casing wells. This was one of the first attempts to control and conserve ground water. Since then many other states and communities have taken steps to conserve their ground water supplies.

Improper use of ground water reservoirs is not confined to artesian flows by any means. Actually, the majority of cases of improper use are in areas where water table conditions prevail. Several years ago it was discovered that a large depression in the water table existed at Grand Island, Nebraska. This city is located in the Platte River Valley, one of the best water producing regions in the United States. Many wells averaging 150 feet deep had been constructed in Grand Island which were pumped at 1000 to 1500 g.p.m. from sand-gravel formations. The people in that area had always thought the underflow of the Platte River was an inexhaustible ground water reservoir and that there was no such thing as a water shortage. At the same time, the water table at Grand Island and vicinity was steadily going down and the city was faced with a water shortage. On investigation it was found that the pumpage from the underground reservoir was over 7860 acre feet or an average of 7,000,000 gallons per day in 1937. Estimates of recharge into the area indicated that about 5900 acre feet or 5,300,000 gallons a day could come into the area. It was apparent that water was being pumped from ground water storage, which accounted for the steady lowering of the water table. The problem was solved by the city abandoning some of its wells and locating new ones farther apart. This simple solution is the answer to many ground water problems, especially where heavy pumpage is reducing the water table levels in a local area.

When considering ground water reservoirs, we must take into account natural losses, such as springs, leakage into streams and into other nearby reservoirs. While it is almost impossible to keep springs from flowing, it is possible to conserve their flow and make the best use of it. Hydraulically, the flow of springs is oftentimes hard to explain. There are many different kinds of springs varying in flow from a few drops of water to thousands of gallons per minute. Tolman in his book "Ground Water" classifies springs as follows:

1. Springs issuing from pervious veneer formations.

2. Springs issuing from thick pervious formations.

3. Springs issuing from interstratified pervious and impervious formations.

4. Springs issuing from solution channels.

5. Springs issuing from lava.

6. Springs issuing from fractures.

Only a small portion of the available springs are developed or used to their full capacity. Many

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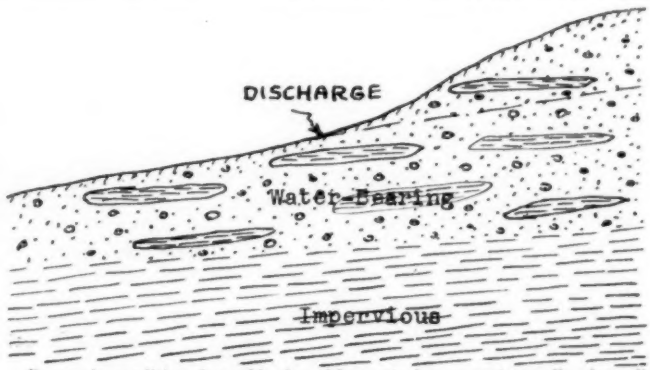
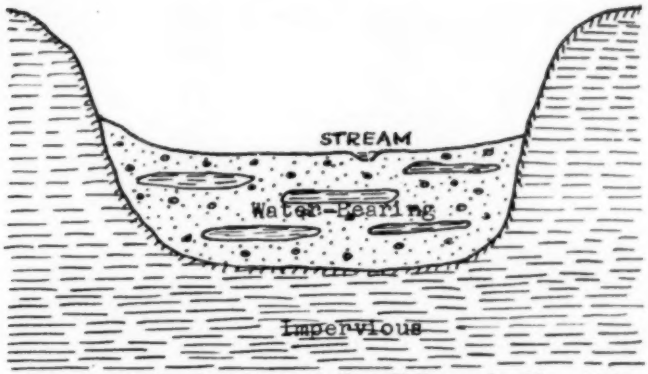


Reservoir condition favorable for either artesian or water wells, depending on amount of discharge or natural leakage. Water-bearing formation recharged by percolation from surface.



Reservoir condition in tight river valleys. Wells may be either artesian or water table, water-bearing formation recharged by percolation from ground surface or flow in stream.

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are partially used and the overflow allowed to run off as waste.

The largest springs in this country are those in Florida, Texas, Alabama, Idaho, California, and Oregon. Many of them furnish the principal supply to rivers, others furnish water both hot and cold with medicinal properties. All in all, our springs are a valuable source of water which should be utilized and also conserved wherever possible.

On the subject of safe yield of ground water reservoirs, Harold Conkling, Consulting Engineer, in Los Angeles, California, prepared a paper which is referred to on account of its masterly handling of the subject. First of all, Conkling points out the fact that a ground water reservoir is a natural thing and its capacity is set by nature. Furthermore, the capacity of a ground water reservoir cannot be easily determined as there are many factors which must be considered, some of which may have no bearing on the question. For this reason, only engineers with a vast experience in ground water problems are qualified to determine or even estimate the yield of a ground water reservoir.

After the outline, depth and safe yield of a ground water reservoir have been determined, there remains the question of efficient management and operation. It may be found desirable to pump more than the safe yield in periods of drought to provide ample storage room for periods of heavy recharge. Each ground water reservoir varies in this respect. The idea is to look at a ground water reservoir as a place to store water whenever possible rather than a place to furnish water in unlimited quantities.

In order to obtain the full benefit of any ground water reservoir, it is necessary that it be scientifically investigated sooner or later. We have explained how this is done by means of ground water surveys. There remains only one further step and that is the use of wells adapted to the underground formation conditions and type of water to be pumped. It goes without saying these wells should be properly located and then operated so as to produce the maximum yield of the formations without excessive drawdown. Furthermore, wells should be located in such a way that recharge is increased and natural losses reduced. If this is done, every one will be able to make more use of our ground water reservoirs.

In view of the fact that practically all of the ground water shortages that have developed up-to-date have been due to concentrated overpumping, it would seem logical to begin now to introduce modern methods into well building, spacing, and pumping in order to get the best use of our ground water reservoirs. We must also make more use of the storage capacity of our ground water reservoirs in times of flood and wet years. In other words, it is up to the users of ground water to see that our ground water reservoirs are used properly and that every one gets the maximum benefit from them within the limits of good management and their safe yielding capacity.

"He's left-handed and keeps his change in his right-hand pocket," mentions Cutie Cathead in telling about her boy friend.

—o—

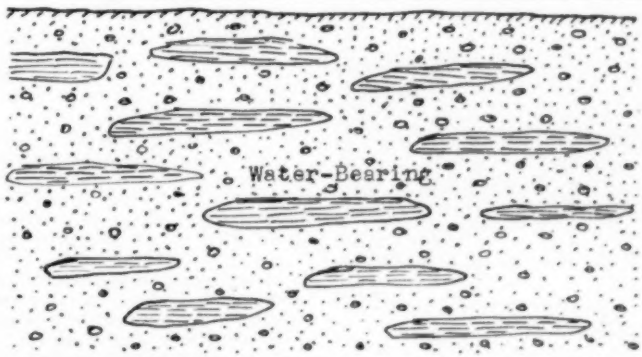
Son—"Say, Dad, is it Atlas that supports the world?"

Father—"No, Son, that's Uncle Sam."

—o—

She — "Men are contemptible beasts!"

He—"Yeah, I know. That's why I run around with women."



Reservoir condition favorable for water table wells. Water-bearing formation recharged by percolation from ground surface.

MINNESOTA WATER POLICY

The statutes of the State of Minnesota define the water policy of the state as follows: "In order to conserve and utilize the water resources of the state in the best interests of the people of the state, and for the purpose of promoting the public safety and welfare, it is hereby declared to be the policy of the state, (1) that subject to existing rights, all waters in streams and lakes wholly within the state and such portions of all boundary streams and lakes as lie within the state, which are capable of substantial beneficial public use, shall be public waters, and shall be subject to the control of the state; (2) the state, so far as practicable, shall control the appropriation and use of surface and underground waters of the state; and (3) the state shall supervise, so far as practicable, the construction, reconstruction, repair, removal, or abandonment of dams, reservoirs, and all control structures in any of the public waters of the state."

To make the water policy of the state effective, the Division of Waters in the Department of Conservation was set up several years ago. This Division under the present Director, Sidney A. Frellsen, has broad powers to formulate and develop a general program of conservation of water resources.

Boring rig used by E. R. Zeigel, contractor of Olathe, Colorado, for concrete piling, bell footings and test hole drilling.

Pacific Water Wells, Inc. of Victoria, B. C. constructed several wells for H. R. MacMillan Export Company at their Nanaimo plant in British Columbia using 20-inch Johnson Screens 20 to 30 feet long. The well pictured produced over 3000 gallons per minute on test.

Ground water investigations have been made in several locations, some under co-operative agreement with the U. S. Geological Survey and others by the Division personnel. It is recognized that there is further need of such investigations in order to increase the information now available and to determine the future uses of ground water in agriculture, municipal and industrial developments.

The same sort of program is being carried out with reference to surface waters, namely, the accumulation of data on the variation of lake surfaces and the volume of water flowing in streams. One of the principal activities of the Division in recent years was the construction of more than 350 dams at the outlet of lakes to maintain their water levels during periods of low precipitation.

The adequacy and availability of water supplies for industry has engaged the attention of the Division for some time. The right of the state to control public waters has been challenged on several occasions. While these issues are primarily legal questions, the Division of Water and the Division of Lands and Minerals have become the agencies which are called upon to investigate and report on the proposed projects. Already the question of "priority of use" of available water supplies has been raised. This is not within the jurisdiction of the Department. Eventually legislation will have to be passed to define "priority of use."

The Division also has other problems involving public waters, such as the question of pollution by mining wastes. Under present statutes it is stipulated that "before any person or agency may appropriate water in any appreciable volume from the public waters, or change the cross-section of the beds of streams or lakes, a permit therefor must be obtained from the Commissioner of Conservation." Judging by the number of applications received, this is an important part of the Division's work at the present time. In addition, permits are required for irrigation wells, though the Division is handicapped on account of the failure of the legislature to indicate within what limits permits for the use of water should be granted. Drainage prob-

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lems also come under the jurisdiction of the Division, though a lack of basic data usually limits its interest to an examination of the project engineer's data.

All in all the Division of Waters is functioning to the best of its ability considering the woeful lack of basic data, definite legislative authority, and interest on the part of the general public.

THE LEGAL STATUS OF WATER

(Continued)

ARKANSAS

No statutory provision for control of diversion of water at present. Bill prepared before the last session of 1948-49 legislature proposed to establish, under the police power of the State, the principle of prior appropriation of surface water for beneficial use, to be administered by State Resources and Development Commission. Ground water was not included, but one of stated purposes of proposed act was to "facilitate the conservation of ground water in many areas" by encouraging surface-water developments. Bill was not introduced to legislature. A similar bill had been introduced in a previous session of the legislature but did not pass. A bill for an act to make the filing of water-well logs mandatory was introduced to the 1948-49 legislature but was withdrawn. Surface-water legislation may be introduced in the 1950-51 session.

Mr. Cornelius Snelton of Northbrook, Illinois has been in the well drilling business over forty years. He is shown in the picture. His son, Arthur C. Snelton, is also a driller and between the two of them they keep their Bucyrus-Erie rigs busy as well as their pump repair business in the northern part of Illinois.

Elwood McGinnis established a drilling business at Absecon, New Jersey in 1928. Since his death, the business is carried on by his three sons, David E., Willwood S., and Charlton S. The picture is of a 4-inch well 157-feet deep producing 400 gallons per minute from a Johnson Screen.

CALIFORNIA

All water is declared by statute to be property of the people of the State, but available for appropriation for beneficial use, subject to existing rights.

Under California law both riparian and appropriative rights are recognized in water of surface streams, and also "subterranean streams flowing in definite channels." Riparian rights do not include right to store water for future use. Springs that are the source of streams are subject to the law of watercourses, but a spring from which no stream naturally flows ordinarily belongs to the land owner, except that appropriations of spring water on the public domain are protected against subsequent entrymen. Ground water not shown to constitute a "definite underground stream" is presumed to be percolating. There is no statutory control of "percolating water," but court decisions have established the doctrine of correlative rights, and also have "percolating water" available for appropriation where there is more than enough for the reasonable use of overlying land owners, or where the landowners are not using it, but subject to their future use at any time. Interconnected surface and ground waters are treated as a common supply, the rights of overlying landowners, owners of riparian rights, and appropriators being correlated on a basis of reasonable beneficial use. All rights of every character are limited to use for reasonable and beneficial purposes under reasonable methods of diversion. All rights are subject to loss in whole or in part by prescription.

By statute, water-right filings made by the State covering surplus or unappropriated waters for a coordinated plan of water conservation may be released or assigned for developments not in conflict with such a plan and not in conflict with the needs for future development of the county in which the water originates. The statute providing for such preferential rights of counties is commonly referred to as the "Counties of Origin" act.

(To be continued)

"I've got a lot of things I want to talk to you about," the wife announced.

"That's nice," sighed her husband. "Usually you want to talk to me about a lot of things you haven't got."

JOHNSON NATIONAL DRILLERS JOURNAL

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TOM'S COLUMN

Dear Fellows:

Well sir, the good wife and me are back again after a 6,000 mile jaunt in the old jalopy that had us ramblin' around the west coast. The boy has been doin' his stretch in Japan an' Korea and looked fairly good when he come down the gang plank in San Francisco. He's bein' shifted to duty at a army camp in this country as an instructor—we hope it will be that way 'till his time runs out. Like all of these young fellows who have had a taste of ugly fightin' he don't want to talk about war but he sure out-gabbed me when it come to drillin' talk. We been pretty lucky so far—and I was thinkin' there at the harbor of the thousands of mothers and fathers who won't have the thrill of welcomin' a boy back home. Well, we had a few days together before he had to report back an' then me and ma gassed up the old car an' shoved out over quite a stretch of country. It was a good trip but it'll take about half as long again for to get the creaks an' the stiffness out of the old joints. Gettin' around this way an' talkin' to people in all sorts of places kind of helps you to understand more about the problems that affects the different sections, an' what people are thinking. Whenever I hit a place where we could spend a few hours I went around like an' old bird dog lookin' fer a well driller. Talked to quite a lot of 'em. Interestin' to get their slant, especially in the sections where ground water problems have always been a real headache. In some places where there is little or no industries the need fer water supply is taken care of pretty much by ordinary wells. There's other sections where they gotta depend on irrigation in the farmin' country as well as fairly heavy water demands in towns where new industries have started up, an' the situation is dog-gone serious. A good many of the drillers are still dependin' on punchin' holes for water on the by guess an' b'gosh method, but I met up with some who really go in fer a study of all the factors that must be considered in meetin' conditions in the area they work in. Met some funny ones too. There was one place where we was takin' on some grub in a little hotel an' I got to talkin' to the proprietor. Asked him if he know any well drillers around there an' he named a fellow who was sort of a town character. Asked him where the man lived an' he says mostly in the town jail. Seems he an' the town marshall was feudin' a good deal of the time but a small size scandal developed when the town authorities found out they was buddies under the skin. Seems that this town marshall was the only police officer an' got a small salary but was paid a fee of a couple of bucks for makin' an arrest. Well, he an' the driller appeared to be havin' a rumpus every so often and in the end the

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driller always wound up in the klink. Some of the leadin' citizens got suspicious about it because while our pal the driller was figgered the town nuisance—he seemed to provide the marshall with some tidy fees. Sure enough a little snoopin' on their doin's brought out that the driller would make trouble leadin' up to the arrest an' then they'd divvy the fee so's to supply beer money fer their own drinkin' bouts they held out in what the driller called his tool shed. This hotel man was tellin' me that on a coupla occasions the mashall would pinch the driller followin 'one of their own parties. Well, I says, is he a good well driller. He says he would'nt know much about the drillin' business, but the fellow had a rig an' seemed to get some work every now an' then. I was kind of curious to meet the guy an' found him in one of the town's three drinkin' places. I introduced myself and told him we was both in the same line of business. Offered to buy a drink and he says sure. He wanted some kind of ale—I forget the name, an' when the barkeep served it he hollered at him because he forgot to put in the tomato juice. I never ran across anybody drinkin' a combination like that—so I asked him how come, seemed to me that such a concoction would sure cause an uproar in a man's innards. He looked at me like I had'nt been around much, pardner, he says, this drink thing was your idea, are you offering to buy me a drink as a social gesture or are you one of them clinical snoopers who'd like to regulate other people's appetites? I told him he should'nt get me wrong, he could go ahead an' swallow arsenic an' the nectar of mazoleum if he cared to. He poured a big gob of tomato juice into the ale an' then sprinkled some paprika over it an' gulped it like it might be a mild glass of sody water. Then he says in a friendlier tone, you see pardner I patronize these taverns because they happen to have the ingredients fer health giving potions. Ale, says he, taken at proper intervals assures long life—the tomato juice contains the vitemins the human body needs fer the long life its gotta go through. Well I sez whats the paprika for—oh, he says I toss that in fer to let me know that the stuff hits into the right places. Well, figgerin' I had a balmy guy on my hands I steered the talk around to drillin'. Nope, he says, he aint never bothered to fool around with the truck these panty waist fellows put out about formation analysis an' ground water dope. If they want a well I punch 'em a well, he says, that's what they asked fer and that's what they get. He takes his divinin' rod an' picks a location, goes down till he hits water. If the well don't keep on producin' that's because the Lord did'nt give the place enough water an' it aint his fault. I says, do you figger you're just supposed to drill the well, or do you feel you oughta be concerned with providin' a water supply? I dig 'em a well—that's what they hire me fer an' thats what they get. It was fun knowin' the guy fer a short while but I been wondering how many of the boys in our business take that slant on what we owe to a customer who would'nt be buyin' a well if he did'nt need a water supply.

Frank H. Lofton of Fredericksburg, Indiana, drilling a 6-inch well 140-feet deep. This drilling contractor has been in business over thirty years and has established himself in his area as a capable experienced driller.

On the other side of the picture its encouraging to talk to the fellows who are takin' the job seriously. Maybe you have read in the papers about some of the meetings that are goin' on. These aint just ordinary driller's meetings, but reg'lar conferences gotten up by big universities and the like. There was one just a short time ago that I would've gone to if I'd a known about it earlier because we was headin' in that direction at the time. I read about it in the papers an' later met up with a few of the people who sat in on it. You see these big agricultural an' technical colleges have kind of woke up to the importance of water well construction. So has the gover'ment an' the big industries. This meetin' I'm talking about was held in a region where they must depend on irrigation, an' there's always been some trouble getting enough water. The people who came included a lot of the farmers and others who needed water supply, as well as the drillers. When the conference got under way it was the farmers who put the drillers on the spot by showin' all the well failures they'd had to pay for only to find out afterward that the drillers made no proper efforts to find out all there is to know about the water bearing formations. One man paid good dough for five straight failures, an' he was'nt fooling about what he thought of the driller service he'd gotten.

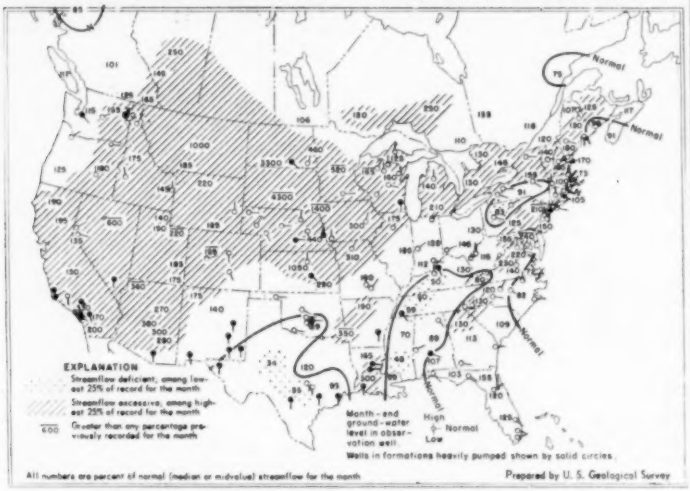
As one of the speakers pointed out, its only durin' the last ten or fifteen years that scientists have become interested in well construction—but you can bet your last dime they're going into it now, 'specially in those parts where this ground water problem has 'em worried. Drillers who take their business serious ought to be glad of it because it puts our business on a higher plane. We have sources of information now that can help us figger out pretty near anything we need to know to start a job right. If we aint takin' advantage of it we're lettin' the parade go by without havin' any part in it. Well, I'm shapin' up the rig to bite the dust that the politicians are kickin' up this summer.

Good luck to all of you.

Yours truly,

TOM.

SURFACE and GROUND WATER CONDITIONS


Normal
Normal
Normal
EXPLANATION
Streamflow deficient, among lowest 25% of record for the month
Streamflow excessive, among highest 25% of record for the month
Greater than any percentage previously recorded for the month
Month-end ground-water level in observation well
High
Normal
Low
Wells in formations heavily pumped shown by solid circles
All numbers are percent of normal (median or midvalue) streamflow for the month
Prepared by U. S. Geological Survey

STREAMFLOW AND GROUND WATER IN RELATION TO NORMAL FOR THE MONTH, APRIL 1952

From Water Resources Review for March, 1952, we learn that record breaking floods occurred in scattered areas throughout the United States, with ground water levels at or near record lows for March from Louisiana to Southern California. The drought in Texas continued with a return to drought conditions in Louisiana.

In Central New England there was substantial runoff in the northern part, but ground water levels rose during the month and reached a new 12-year high in Middlesex County, Massachusetts. Ground water levels also rose in Connecticut.

Farther south ground water levels in a key well at Petersburg, Virginia, registered a 10-year high. Heavy stream flows were noted in Kentucky, North Carolina, Georgia, and Tennessee. This was in contrast to the situation in a large part of the Great Lakes basins. Here runoff was below normal in spite of several local floods.

Runoff on the lower peninsula of Michigan was normal with water levels higher than those of a year ago. In Wisconsin high levels were observed in key wells at Eagle River and Harshow, while low levels were observed in a key well into the heavily pumped sandstones near Milwaukee. The spring runoff in Minnesota was normal. Ground water levels in Nebraska continued to be above average.

In the Texas area the flow of all major streams continued below normal as did the ground water level in all key wells. The drought in Louisiana continued with low stream runoff throughout the area. In the West melting snow caused floods in Oregon and Montana and high runoff in southern California. Lack of snow melting lowered the runoff in Utah and Arizona, however, snow cover was heavy throughout the West.

In April floods and high waters covered large areas in the United States, with the largest flood known to white man in the Missouri River. This record flood was due to warm winds and melting snow, in combination with frozen ground and ice filled rivers. To add to the situation, there was a small flood in the upper parts of the Mississippi River valley at the same time due to melting snow in central and southern Minnesota. Floods of unusual porportions occurred in the Salt Lake City area, as well as the Milk and Snake River basins.

New ground water levels were noted in a key well at Ewing and at the Lincoln well field near Ashland, Nebraska. In western Kansas ground water levels had a slightly downward trend in April, while those in central and eastern Kansas above normal since last summer were raised to a still higher level. At Shenandoah, Iowa, water levels in a key well were at record high for April.

Water levels in southwestern Louisiana remained low while those in the state were above average. The levels in key wells in Texas remained low in April and those in Michigan remained high. Water levels in the heavily pumped areas of New Mexico and Arizona continued to show record lows. Conditions in key wells varied throughout the East. Levels were lower in Vermont, eastern Massachusetts and southern Rhode Island, though above average for the area. They rose in New Jersey, Maryland, West Virginia and Virginia.

GROUND WATER SITUATION IN JAPAN STUDIED

A report on ground water conditions in Japan, together with recommendations to the Japanese Government on corrective measures needed, has been placed in Geological Survey files open to public inspection, Secretary of the Interior Oscar L. Chapman has announced.

Maurice L. Brashears, district geologist for New York and New England in the Ground Water Branch of the Survey, accomplished the study as visiting expert consultant in the Mining and Geology Division, General Headquarters of the Supreme Commander for the Allied Powers, in Tokyo.

The report states that, although only meager data have been collected on ground water usage and availability in Japan, rough estimates indicate that ground water reserves amounting to about 140 **trillion** gallons are available for maintaining crop yields and furnishing supplies for other activities during extended periods of dry weather. To reach this figure it was assumed, from available information on the geology, that 25 per cent of the land area of Japan is underlain by saturated, water-bearing rocks having an average thickness of 90 feet of which 20 per cent

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represents water that would drain into wells. That quantity, 140 trillion gallons, is about 15 times the amount of ground water currently withdrawn in the United States each year.

However, local situations present problems that are at considerable variance with this general over-all picture. Ground water is used extensively in Japan for irrigation, industrial processing, and public and domestic supply. Records are meager and scattered.

Mr. Brashears was able to determine, however, that water is taken from more than 5,000 large-capacity wells and many thousands of smaller wells. In Tokyo alone there are nearly 900 large-capacity industrial wells. Daily pumpage is unknown, he says, but is estimated at more than two billion gallons.

"Heavy pumping has reduced artesian flow, has increased the pumping lift in wells, and has caused land subsidence and sea-water encroachment in many areas," the report adds. "Such detrimental effects have occurred in the Osaka, Nagoya, and Tokyo areas as well as in other regions. Great monetary loss has resulted, and further loss is likely if existing trends continue."

"Systematic and continuous studies of the ground water resources never have been made," says Mr. Brashears. "Information as to the amount and rate of utilization and the fluctuation in the amount of water stored underground is very incomplete. Consequently, costly situations due to excessive utilization develop unnoticed because trends are not charted."

The recommendations detailed in the report advise the Japanese Government to establish and adequately finance a scientific bureau charged with making systematic and continuous investigations of both ground water and surface water supplies. Part of the effort of this agency should be directed toward the preparation of educational reports explaining the value and potentialities of ground water resources and promoting the improvement of well-drilling methods. Assistance should be given to the well drilling industry to obtain modern

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ASSOCIATION NEWS

This section is devoted to the exclusive use of water well drillers' associations, both state and local. Notices, announcements, changes of officers and other items should be sent to The Editor, Johnson National Drillers' Journal, 2304 Long Ave., St. Paul, Minnesota.

PENNSYLVANIA MEETING

At a recent meeting of the Western Section of the Pennsylvania Water Well Contractors Association held at Beaver Falls, Pennsylvania, the following officers were elected for the year 1952-53:

President, Owen W. Lininger, Greenville; 1st Vice-President, C. J. Markel, Jeanette; 2nd Vice-President, Ralph Miller c/o Pittsburgh Pump and Supply Co., Pittsburgh; 3rd Vice-President, William B. Johnston, c/o Harris Pump & Supply Co., Pittsburgh;

Directors:

James Corby, DuBois
Fred Albright, Altoona
Paul Wright, Bellefonte
Orion Freer, Port Allegheny
Wayne Ferguson, Allison Park
Joseph Heidelmeier, Washington
Paul Boehm, Baden
Dwight Moody, Meadville
Clifford Parker, Sharon

The next meeting of this section will be held June 7, 1952 at the Deming Pump Company, Salem, Ohio. Mrs. Muriel Butcher, Washington, Pennsylvania, is Secretary-Treasurer of this section.

CONNECTICUT MEETING

The annual meeting of the Connecticut Well Drillers Association was held on January 24, 1952, at the Bond Hotel in Hartford, Connecticut. Mr. Staley H. Trask of Norwich was elected President, Otto F. Lippolt, Danbury, Treasurer, and Gene Bronzi, Torrington, Secretary.

Interest in this association is growing rapidly throughout the state and several Vice-Presidents were elected to serve the following counties:

Hartford, Tony Leone, East Hartford.
Litchfield, Winthrop Phelps, Bantam.
Windham, John Warner, Willimantic.
Tolland, Edward Gaines, Rockville.
New London, Peter Pettini, Stonington.
Fairfield, George Fancher, Ridgefield.

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Lloyd E. Ogle is shown watching the flow of water from a 6-inch well on his Crooked Creek ranch. While the well was primarily to supply a swiming pool, Mr. Ogle now plans to dam the flow and use it for irrigation. F. R. Williams of Lakeview, Oregon was the driller.

ASSOCIATION NEWS

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NEW YORK MEETING

The second quarterly meeting of the Empire State Water Well Drillers Association was held at the Governor Clinton Hotel in Kingston, New York, April 16.

The speaker for the meeting was Harry Edinger, Ulster County Department of Health, on the subject "Code of Practice, Well Contractor and Public Health."

The meeting closed with a banquet and entertainment in the evening. The next meeting will be a picnic and roundup in July. Clarence W. Crandall, Pine City, is Secretary-Treasurer.

OHIO MEETING

This association held a regular meeting in Columbus at the Chittenden Hotel on April 19.

The program was in charge of the Fairbanks, Morse Company who entertained the group at lunch and provided a display of pumping equipment and accessories.

Similar meetings will be held over the state at the invitation of manufacturers. Mr. E. D. Allen of Steubenville, Ohio, is Executive Secretary.

MONTANA MEETING

This association will hold its annual meeting at Missoula, Montana, at the Florence Hotel on August 4 and 5. A room will be available for displays and arrangements for the meeting are being made by Mr. Russell Mobray of 127 Mount Avenue, Missoula.

Mr. B. W. Whitmer of Circle, Montana, is Secretary-Treasuer of the association.

INDIANA MEETING

The 21st annual meeting of this association was held in the new Conservation Building on the Indiana State Fairgrounds April 9, 10, and 11, 1952.

The meeting was called to order by W. L. Gordon, President, with a large number of drillers and jobbers representatives present.

The afternoon session was taken up by technical matters with Mr. George G. Fassnacht of the Iniana State Board of Helath discussing the subject of "Solving Sanitation Problems in Home Water Supplies." Representatives of two insurance companies talked on casualty fire and allied lines of insurance.

Mr. Charles H. Bechert, Director of the Division of Water Resources, spoke the next morning on the subject "Water in Indiana, Past, Present and Future."

The usual banquet and entertainment was held in the Gold Room of the Hotel Antlers on Thursday evening. The meeting closed after a "Question Box" and guided tour Friday afternoon.

MICHIGAN MEETING

Harold Armstrong of Battle Creek, Michigan, Chairman of the 1952 convention of the Michigan Well Drillers Association, is completing plans for the biggest convention they have ever had.

All exhibits will be housed in the Stadium, which is located on Turner Street in the convention city of Grand Rapids. Headquarters will be in the Rowe Hotel.

Exhibits and demonstrations of well machines from manufacturers throughout the country will be a part of the program, during the meeting days, June 26 and 27.

On Friday night, the 27th, there will be a banquet, floor show and entertainment galore for all. Write to Mr. Armstrong for details of arrangements.

Mr. J. R. Maughan of Macleod, Alberta, repairing a well for the Town of Warner, Alberta; 160 feet of 4-inch pipe was pulled from this position and the same amount of new replaced without getting up in the air to do it.

MICROFILM SERVICE

Edward E. Johnson, Inc., 2304 Long Avenue, St. Paul 4, Minnesota, has entered into an agreement with University Microfilms of Ann Arbor, Michigan, whereby issues of The Johnson National Drillers Journal are available to libraries in microfilm form.

One of the problems confronting libraries today is that of providing space for an ever-increasing number of publications. Periodicals present a particularly difficult problem due to their bulk and number.

Microfilm make it possible to produce and distribute copies of periodicals on the basis of one entire volume in a single roll in editions of 30 or more, at a cost about equal to the cost of binding the same material in a conventional binding.

Under this plan, the library keeps the printed copies for two or three years which corresponds to the period of greatest use; when the demand for printed copies is over, they are disposed of and microfilm is substituted.

Sales of microfilm copies are made only to those receiving the paper edition and the film copy is available only at the end of the volume year. The microfilm is in positive form and is furnished on suitably labeled metal reels. Inquiries for purchase should be sent to University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

GROUND WATER SITUATION IN JAPAN STUDIED

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equipment and technical help, the report states.

In conclusion, the Japanese Government is advised to consider carefully the need for establishing laws that would control the use of ground water and the drilling of water wells—laws of the type that could be invoked when scientific facts indicate a need for corrective measures over limited areas. Such laws would have prevented the unfavorable conditions that have developed in many parts of Japan, but would not have interfered unduly with the use of well supplies elsewhere in the nation.

During the next decade Japan is expected to develop many extensive water supplies for irrigating new crop land, for increasing industrial production, and for enlarging municipal water systems. A comprehensive national policy for such development is greatly needed, the survey concludes.

(Note:) Mr. Brashears who made the study in Japan has recently gone into partnership with R. M. Leggette under the firm name of Leggette and Brashears, Consulting Ground Water Geologists, 551 5th Ave., New York.

ADVERTISEMENTS

We will insert advertisements for drilling equipment wanted or for sale, help or work wanted, etc., for our readers, free of charge. Advertisements must be brief, and we cannot assume responsibility for them, but will be glad to put parties in touch with each other by this means and suggest that they investigate any offers or inquiries carefully for themselves.

FOR SALE: Two used machines, telescope derricks, truck mounted; can be seen running; excellent condition; priced to sell. Write: Creelman Artesian Well Company, 38 Maple Street, Dover, New Hampshire.

FOR SALE: To settle an estate. Bucyrus-Erie new tools, never used, threads greased and bright all API; one swivel wire rope socket 3¼"x4¼"-7 with box protector and mandrel; One drill stem 6"x10' LG 3¼"x4¼"-7 pin joint, 4"x5"-7 box and protectors; two jack end tools wrenches, right hand and left hand; one No. 2 oil well circle jack; one fishing jar 6"x24" stroke 3¼"x4¼"-7; two drill bits regular 1,000 lb. 4"x5"-7 with protectors; one fishing jar 5½"x36", 2¾"x3¾"-7; one drill stem 5"x20' wgt. 1,337, 2¾"x3¾"-7 drive clamps heavy pattern, size square 3½" diam; 4"x4½"x 16" weight 204 lbs.; one No. 22 Barrett swivel wrench with plate and two squares; will sell all for 25% of new price; one box with bail for handling bits 4"x5"-7. Write or call: Maurice Wells, Oakfield, Wisconsin, Route 2, telephone 81F2; four miles south of Oakfield.

FOR SALE: No. 30 Sparta Wood frame band wheel type machine, steel 38' one-piece derrick; mounted on 2½ ton 1934 Dodge truck, complete with 350'-⅝" drilling cable and 350'-⅝" sand line; bargain with or without tools. Write: Ray Van Hercke, Little Falls, Minnesota.

Jungmann Bros., Topeka, Kansas testing well in Kansas pumping 1,000 g.p.m. from 71-foot well with 20 feet 12-inch Johnson Screen.

FOR SALE: Two No. 26 Cyclone drilling machines; two No. 2 Clipper Machines; one Ideco No. 6 in new condition; one Kalamazoo Hollow Rod Machine; tools for above are available, all are truck mounted and in good condition; all or your choice at a bargain price. Write: Norman Staebler, Turner, (Arenac County), Michigan.

FOR SALE: 1947 No. 71 Speed Star mounted on 1940 Chevrolet 1½ ton Thornton rear end tamden drive truck; this machine newly cleaned and painted and in storage two years; 40' mast 47 h.p. Continental red seal motor, dual catheads, blower mounted on rig, tool guide; complete string 6" tools; price $4,200.00. Also Bucyrus-Erie 33W on 1937 Chevrolet 1½ ton truck, no tools, price $2,000.00. Write: W. J. Rodgers, Gulliver, Michigan, phone 3392 after seven in the evenings.

FOR SALE: Two truck mounted drilling machines with 600 feet of ⅝" drill line and ⅜" sand line, machines and trucks are in good condition, with good rubber; one goose-neck trailer mounted 71 Star; this machine is in good shape with new V-belts and brake lining on bull and sand reel; tools from 5 to 12 inches; plenty of drill bits; nine stems jars, swivel sockets, set of elevators, swivel wrench, circle jack drive blocks, some fishing tools and pump tools, also have about 500 feet of new 5-inch pipe that will go with this equipment if sold as a unit; will sacrifice for $5,500.00 cash. Write: John R. Neidig, Route 1, East Moline, Illinois.

WANTED: Acme 3 cutter underreamer for 4" hole, w/ 1½x2¼x8 API pin, must be in good condition; Straight blade star bit for 4" hole, 1½x2¼x8 API pin jt., weight 150 lbs.; one set tool wrenches, claw end for 2½ or 2¾ sq. w/bar and chain tightner for same. Write: Kriska Well Drillers, Seffner, Florida.

FOR SALE: One set of 6" drilling tools with two drills, 12' stem, blocks and wrenches and socket; used only on one well; $450.00. Write: Chester R. Drake, Marshall Well Service, 329 S. Grand Street, Marshall, Michigan.

WANTED: Clutch for a Cyclone No. 10 wooden frame drill machine about 40 yrs. old. Write: R. F. Hair, Route 2, Box 429-B, South Military Trail, West Palm Beach, Florida.

FOR SALE: Model 50 Keystone drilling machine with Buda engine, 38-ft. mast, tool guide and cable holder; in A-1 condition, stem, jars and swivel rope socket, practically new; bits for 4⅞", 5¼", 6¼", 8", and 10" holes; machine just mounted on a good White truck last summer, new battery; good tires; two good spares; reason for selling, been in the busines for 50 years and wish to retire. For more information, write or call: E. C. Rudert, Box 32, Saxonburg, Pennsylvania.

FOR SALE: Five inch 30-ft. long drill stem; two 12-inch drilling bits. Write: Hagenah Well Drilling, Cole Camp, Missouri.

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FOR SALE: Good home-made hydraulic well drill, wood frame, 5 h.p. engine mounted on trailer, rubber tires, with or without tools; 200-ft. drill rods and bits from 2" to 5". Write: L. V. Croot, Iowa Falls, Iowa.

FOR SALE: All steel rebuilt Lydecker mounted on '34 Ford truck; two strings of tools; 1"x3"x18' stem, 2½" pin; 1"x3½"x14' stem, 3" pin; jars for both stems, wrenches; toggle bar, circle and jacks, 4, 5, 6, and 8" bits; drive clamps and chain tongs; pipe wrenches, chains, chain hoist, pipe fittings, blower and forge, hand tools, and everything needed to drill a well; everything for $900.00. Write: A. N. Leatherwood, 3036 Clime Road, Columbus 4, Ohio.

FOR SALE: No. 40 Speed Star, 31-foot derrick power hoist; Continental 4-cylinder motor with starter; 400 feet ⅝" drilling cable; 300 feet ⅜" sand line with a string of 4" tools, joints thread 1½x2¼x8 API. All this rig needs is a driller as I am unable to operate it. Priced $1,200.00, less truck; also have for sale one string new 6" tools and miscellaneous items at $400.00. Write: Richard Henderson, Route 2, Kewanna, Indiana.

FOR SALE: Well drilling business, 71-Star, modernized No. 3 Keystone, both truck mounted; complete tools 4" to 20". Physical inventory $15,000.00. Nets $6,000.00 to $8,000.00 yearly; this is industrial — no pipe worries. SALES PRICE: $11,000.00. Owner retiring. Write Box NDM, c/o Edward E. Johnson, Inc., 2304 Long Avenue, St. Paul 4, Minn.

FOR SALE: Failing and Sullivan rotary drills, complete, tools, drill pipe, etc. Priced from $4,500.00 to $8,500.00. Write: Fred E. Butler, Box 1832, Casper, Wyoming.

FOR SALE: Two-55 Speed Stars, 1951 models, used 5 months. Both unmounted with telescoping masts, casing reels, double cat heads, electric starters. Rigs purchased new for contract job at $4,400.00 each. Will sell for $3,000.00 each. Extra parts we have will go with the rigs. Omaha Drilling Co., 624 Service Life Bldg., Omaha 2, Nebraska.

FOR SALE: Bucyrus-Erie 22-W, excellent condition, has casing reel, besides drilling and sand lines. Power mast-raising reel. Mounted on 2½ ton G.M.C. tandem truck. With lines and tools $5,000.00. Omaha Drilling Co., 624 Service Life Bldg., Omaha 2, Nebraska.

FOR SALE: 71 Speed Star, nearly new, 40-foot telescoping mast, drilling, sand and casing reels, double cat heads, power mast-raising reel. Rig fitted with Star rotary attachment consisting of guides, swivel, 4½"x21' round splined kelly, and rotary table complete. This rig can do cable tool drilling to 1,000 feet and can be converted into rotary rig in a few minutes. Rig is mounted on 1942 K-7 International truck. Complete with everything as is $8,500.00. Omaha Drilling Co., 624 Service Life Bldg., Omaha 2, Nebraska.

FOR SALE: One all steel No. 42 Cyclone drill three years old, truck mounted on '45 Studebaker 6 wheel, truck A-1 and looks the same; machine has drilled about 2,000 feet of shallow hole, looks new and runs the same; engine Red Seal Continental uses no oil; factory rating of rig is 650 feet with 1,500 lbs. of tools; spools over 1,000 feet of cable and is equipped with 750 feet of new ⅝" and ⅜" sand line; derrick is 36-ft. telescoping with power hoist, and tool guide; tools 3"x16' drill bar, 1-4" and 5" bits; swivel socket, drive clamps and wrenches, no-kink, 2 chain wrenches, pressure grease gun; spare tire, derrick, jacks, quick change link on sand line; ready to go for $3,950.00, f.o.b. Antioch, Illinois. Write: C. L. Wertz, Antioch, Illinois, or telephone 403-J.

FOR SALE: Dempster B-15 for sale, trailer mounted, 20 h.p. motor. Bargain $675.00; machine in operation now. Write: W. A. Snyder, Bayard, Nebraska.

FOR SALE: Entire stock of well drillers pipe, over 3,000 feet of 6", 5", 4" and 2"; all couplings and drive shoes. Write: Clarence Chadwick, Deford, Michigan.

FOR SALE: Portable, truck mounted rotary drills, Failing and Sullivan, 1000', 1500' and 2000' capacity, complete tools, pipe, etc. Write: Fred E. Butler, Box 1832, Casper, Wyoming.

FOR SALE: One Bucyrus-Erie 22-W trailer mounted drilling machine; tool guide; catheads; casing reel, Hercules six-cylinder motor; $3,900.00; tools extra; have tools from 4" to 20"—4", 6", 8", 12", 14", 20" bits, 2 stems; wire lines. Write: Jim Feighey, Julesburg, Colorado.

WANTED: Jet well drill machine, give full details and price. Write: Gerald W. Carlson, 722 First Avenue North, Jamestown, North Dakota.

FOR SALE: Two all steel well drill rigs mounted on truck; two 10-foot long 10-inch well screens No. 60 gauge, also pipe for sale. Write: Clarence Chadwick, Box 14, Deford, Michigan.

FOR SALE: One No. 40 Star drilling rig on 1935 Chevrolet truck; 350' ⅝" and ⅜" drilling cable. Price $800.00. Write or phone: William E. Suddendorf, 2951 James Avenue North, Minneapolis 11, Minnesota.

FOR SALE: Bucyrus-Erie 22 W with Hercules engine, casing, reel, spooling device; truck mounted 4-wheel drive Chevrolet; complete with cables and 6-inch tools; machine has been run about eighteen months; all in good condition; ready to start drilling, for $4,000.00. Write: G. A. Linn, Bee Branch, Arkansas.

FOR SALE: Buda earth auger, powered with Buda gasoline engine, good condition; mounted on 1942 1½ ton GMC 4 x 4 excellent throughout; priced at $3200 for quick sale. For details write: Bill Myers, 521 Oak Avenue, San Bruno, California.

WANTED TO BUY: 4½" x 6" Gardener-Denver slush pump, with or without power; must be in good condition. Call or write: Bill Myers, 521 Oak Avenue, San Bruno, California.

FOR SALE: Bucyrus-Erie 24L used very little, and is like new; semi-trailer mounted on dual pneumatic tires, power derrick hoist, guy lines, etc.; One Federal two-ton truck tractor in excellent condition, driven less than 23,000 miles; One 22' flat bottom semi-trailer with nearly new dual tires; price of these three units $6500.00. Would consider selling each unit separately. Write: D. E. Edwards, Inc., West Branch, Iowa.

(Continued on Page 15)

In the July-August 1951 issue of the Journal we showed a picture of a horse-drawn drilling rig used in the early days of the well drilling business in Oklahoma. Mr. Hans Hansen was shown as the driller's helper. This picture shows Mr. Hansen as of today. At the time the picture was taken, Mr. Clarence Henningsen of East Toledo, Ohio, was drilling a well for Mr. Hansen's daughter, Mrs. John Hardin, near Toledo. Being an old driller, Mr. Hansen naturally had his picture taken with M. A. and C. E. Henningsen, the drillers, though he is still a resident of Oklahoma and was only visiting his daughter in Ohio. We have never had anything like this before in the Journal.

(Continued from Page 14)

FOR SALE: Set of jetting pumps complete, hose, swivel, head bits. Write: R. C. Evans, Route 1, Curtis Street, Missoula, Montana.

FOR SALE: Rebuilt steel frame drilling machine, mounted on 4-wheel rubber tired trailer, Model A. Ford motor recently rebuilt, power derrick hoist, complete with drilling cable and sand line, with or without tools for four and five inch wells. Write or call: G. B. Vandenburgh, Armstrong, Iowa, telephone 27.

WANTED: One Bucyrus - Erie model 20-W drill, type D for truck mounting, without truck; with or without drilling tools for three and four inch wells; please state year model, whether one piece or telescopic derrick; whether casing reel, cathead, etc. and condition of machine and cash price. Write: W. G. Law, Troy, Ala.

DRILLER WANTED: To locate in Wildrose, North Dakota. Depth of wells runs from 60 to 300 ft. Driller must have good drilling rig. This locality is in the oil well field area of North Dakota. Write: Martin O. Lien, Wildrose, North Dakota.

FOR SALE: No. 26 Cyclone drill complete with set of tools for 4" wells, excellent condition, mounted on Mack truck; also No. 25 Cyclone drill in good condition less tools and truck, several repair parts and 3 new drill ropes. Write Everett Waltz & Company, Strasburg, Ohio.

FOR SALE: Complete well drilling outfit ready to drill; Failing Model 36 rotary drill on '46 Ford 1½ ton truck with Eaton rear end — complete with hand tools, rock bits, subs, 500 feet drilling rod ("N" rod—4 thread) and adaptors for using 2" pipe for deeper holes and few spare parts; F-6 Ford water truck with portable gasoline pump for loading; two to three thousand feet 4" black T&C pipe; good stock galvanized pipe (around 5,000 feet) ½" thru 2"; business grossed $52,000.00 in 1951; information for buying parts, bits, and pumps at good discount will be furnished purchaser; whole outfit can be transported anywhere on two rail cars; must sell all as being recalled to military service; make cash offer or inquiry to: Jake G. Watson, c/o Andalusia Iron Works, Andalusia, Alabama.

DRILLERS WANTED: Experienced cable tool drillers, preferably those who understand or speak some Spanish. Have plenty of work. Write: Rosendo Campos, Priv. Rancho de la Cruz, No. 24, Zone 8, Delg. Ixtacalco, D. F. Mexico.

WANTED TO SELL OR TRADE: A complete 4-inch solid tool drill rig with jars, stem, and drive clamps, sand bucket; also some 5" dril bits and wrenches for a 3" drill stem. If interested write: Clarence Bismark, Box 119, Grasston, Minn.

FOR SALE: One string of three inch tools including socket, jars, bar, and bit. Price $200.00, Write: Gust Grosch, 2668 Harvester Avenue, St. Paul 6, Minnesota.

Mrs. Mary Dutton (left) and Miss Jackie Currie of the Virginia Supply and Well Company, Atlanta, Georgia, watch C. B. Sattler (right) Myers Sales Training Manager, demonstrate characteristics of centrifugal pump performance. The demonstrator, which shows both the characteristics of the ejector-type and centrifugal pumps, was built by the Company specifically for training purposes. Mrs. Dutton and Miss Currie are the first female representatives ever to attend a Myers sales training class. The class was in session from May 5-8, 1952.

NEW REGULATIONS

A recent revision in the NPA regulations on quarterly allotments of materials to well drilling contractors makes it possible for the driller to include his pipe requirements for larger wells in his quarterly application, beginning with the 3rd quarter. Formerly each well requiring more than six tons of pipe was supposed to be an individual project requiring a separate application for allotment. The limit is now raised to ten tons so that all but the very largest wells can be lumped together in making your quarterly request on form CMP-4C.

Third quarter applications on CMP-4C were due May 15. Fourth quarter applications should be mailed before August 15. If you have any questions about NPA regulations on materials for wells, write us and we will get the answers for you.

FOR SALE: Used 44 Standard Cyclone well drilling machine, equipped with 6 cylinder Continental Gas engine, starter, generator, and battery, 40 ft. telescoping derrick, power derrick hoist, stem guide, cat head and worm feed. Drill less than a year old. Will carry factory guarantee. Write: Sanderson Cyclone Drill Company, Orrville, Ohio.

The largest group of dealer and distributor representatives ever to attend an F. E. Myers & Bro. Co. Sales Training Class in Ashland, Ohio, convened at the Myers factory on May 5, 1952, for a four-day session.

The group also was unique, in that:

(1) For the first time in its training history, Myers was host to two women distributor representatives.

(2) Also attending the four-day session were members of the Myers newly - formed labor - management committee and several other Myers employees.

A total of 63 persons, including 45 dealer and distributor representatives attended the class. States represented by the trainees included Pennsylvania, Connecticut, West Virginia, Virginia, Ohio, Michigan, Maryland, Illinois, Georgia, Kentucky, Oklahoma, Colorado, South Carolina and Washington, D. C.

The two lady trainees were Mrs. Mary Dutton and Miss Jackie Currie, both of the Virginia Supply & Well Company of Atlanta, Ga.

Over 35,000 persons have attended Myers training classes, either at the factory or in the field, since the program began in 1945. This was the ninth factory class this year.

THE WORLD'S MOST EFFICIENT WELL POINT!

The Johnson Red Head Drive Point, built on exactly the same principle as the Johnson Welded Well Screen, has these features of superiority over the ordinary well point:

1. ***Non-clogging, v-shaped slot.***
2. ***Immense inlet area*—due to continuous inlet slot and direct water way.**
3. ***Extremely strong*— all welded steel construction.**
4. ***No jacket to strip, rip, or puncture.***
5. ***Made of one metal.* This eliminates electrolytic corrosion, which occurs when brass and steel are combined in a well point.**

●

Red Head Drive Points are sold only through recognized stocking jobbers. Write us for the name of your nearest stocking jobber.

●

EDWARD E. JOHNSON, INC.

— manufacturers exclusively since 1904 —

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